PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Dynamic accessibility by car to tertiary care emergency services in Cali, Colombia, in 2020: cross-sectional equity analyses using travel-time big data from a Google API
AUTHORS	Cuervo, Luis Gabriel; Martinez-Herrera, Eliana; Osorio, Lyda; Hatcher-Roberts, Janet; Cuervo, Daniel; Bula, Maria Olga; Pinilla, Luis Fernando; Piquero, Felipe; Jaramillo, Ciro; Collaborative Group, AMORE Project

VERSION 1 – REVIEW

REVIEWER	Mhatre, Sharmila Open Society Foundations, Public Health Program
REVIEW RETURNED	29-Mar-2022

GENERAL COMMENTS	This is a very interesting study and holds promise. The importance of the study is articulated by the author in the description of how this might influence research, practice or policy. However, it is not clear if the researchers actually discuss the study findings with decision makers. If they have not done it then it falls short of meeting its objectives. The objectives need to be clarified – what is accessibility? There is an arbitrary 15 minutes by automated mode of transport that has been designated. How is this derived? Does everyone own or have access to “transportation”. Do people not walk to medical care? How is this taken into account? In the ethical considerations section it is noted that there is no ethics review because there is no human subjects. However at the same time on page it is noted that there is “involvement of diverse stakeholders”. An ethics review will enable some unpacking of definition of equity and the confidentiality safeguards of the data bases and platforms that have been used for this study. The statistics tend to be primarily descriptive and perhaps if they want to prove “inequitable access” it would be good to use some statistical analysis to identify any confounding variables. The discussion and conclusion, as per the aspirations could use some insight into how the results are feeding into policy change. This could only happen if the researchers actually did take the data and share it with policy makers. In addition it would be good to have a discussion on “equitable accessibility”. The assumption of access is through only motor vehicle transport? Is there a differentiation of cars, motorcycle or public transportation – this unpacks the concept of equity further. It is not clear why “distance and congestion” are considered the bottlenecks to access? As per my comments, the study is very interesting but needs clarification of how access is defined and would benefit on conversation of the data with policy makers to strengthen both the rigor and impact.

REVIEWER	Augusto, Orvalho Eduardo Mondlane University, Department of Community Health
REVIEW RETURNED	27-Apr-2022

GENERAL COMMENTS	This is an important manuscript describing accessibility to tertiary health care in Cali, the third major city in Colombia. The authors leverage the unique opportunity of having 2 different forms of reduced traffic due to COVID-19 control policies (July 2020 almost no policy impacting traffic versus November 2020 where harsh measures were in place) to assess what fraction of the population would get more access to tertiary health care. The authors use a combination of public databases, geographical and population sizes, and apparently non-Open Source software to compute travel times. Overall, the manuscript is well written. However, there are important issues. 1. Why 15 minutes is used as criteria for good accessibility here? Please provide some reasoning for this or reference work. 2. There is poor documentation of the geographic assumptions and modelling (eg: what is the speed of the auto? What scenario is considered here? What is the peak traffic scenario or alternative scenario? What the Google's Distance Matrix API does for computing the distance? What KNIME does here? etc…). It is important to describe those here because you use tools that are private and non Open Source (the KNIME) to manipulate public data. 3. On page 6 Line 3 at "2021, and on October 27, 2020, for the week of 23-29 November 2020". I think all dates should be for the year 2020, correct? 4. Somehow, there is a subsection of results inside the methods section. It seems to be a typo. Please verify this. 5. Table 3 and associated text change the the word "variation" to something like "difference" or "change". Variation could be easily confused with variance which has some another meaning. 6. Very good discussion and interpretation of the findings.

REVIEWER	Lawal , Olanrewaju University of Port Harcourt
REVIEW RETURNED	10-Jun-2022

GENERAL COMMENTS	This is an interesting analysis. The distance matrix requires origin and destination. The destinations are clear (Tertiary health care centres), but the origins were not clearly highlighted. I suspect the weighted centroid of each TAZ. I should not be suspecting, it should be clear from the write-up. It is unclear how the outcomes from Table 3 were generated. I suspect that the spatial units (census blocks) were categorised and their centroids used as origins. Details like these should be explicit in the article.

VERSION 1 – AUTHOR RESPONSE

Responses to reviewer comments:

We were pleased that reviewers agree that the test results are valuable for informing health services planning. Their comments helped us deliver a better manuscript and we are glad their contributions will be recognised with an open peer review.

The Collaborative AMORE Project Group is a diverse team of more than two dozen contributors. It includes decision-makers, other stakeholders and consumers who provided inputs to the manuscript and approved it for submission. We will discuss our findings with broader groups and report the value they contribute to the approach and the tools used in future assessments and reports. The Acknowledgements section and a supplementary file we included with our submission (Background of contributors) highlight the AMORE team's diversity.

We define accessibility in the fourth paragraph of the Introduction; we added supporting references. We chose a 15-minute threshold for practical reasons, chiefly because time is a continuous variable, and a new cross-sectional study could be done for any length of time. Local experts and members of the collaborative project, including patient advocates, clinicians, urbanists, and public health experts, consistently chose the 15-minute threshold, which is common in relevant urban and health services planning. We explored health

services quality indicators and found there is no international standard. We cross-referenced two citations and added a reference to support this choice.

While not everyone has a car, private or for-hire cars are the most usual and convenient way of reaching an emergency department in a critical situation in Cali. Local ambulance services are ineffective and not trusted. If necessary, we can add links to news reports supporting these views; we felt it was unnecessary.

We are assessing travel by car. The same approach can explore walking time, bicycle, motorcycle, and public transport. However, that is not the focus of this specific assessment, and these other transportation means are not commonly used in the scenario of a critical emergency requiring tertiary care in Cali. Our study is unfunded; data downloads have a cost, and we chose the most likely and practical scenario.

The study constitutes health systems research and addresses issues in the public domain; it does not involve human subjects research. We have listed as authors contributors to this report, who include public servants who provided input and whom we acknowledged in their official capacity. Other contributors were community representatives, health service providers and users, reflecting BMJ's initiative to promote shared engagement and collaborative construction of knowledge. We added a reference for community engagement.

A detailed discussion on how these results and subsequent elements of the broader AMORE Project impact urban and health services planning and policy are the subjects of additional reports described in a protocol under development.

Distance and congestion prolong trips, limiting access to health services and add to direct and indirect costs. This is more notable when patients use ambulatory services regularly than in the occasional critical emergency. We will discuss this issue in more detail in a different report. We added reference 10, which supports this and other study aspects.

We expanded our geographic assumptions and added more detail on the modelling, traffic clusters, and other aspects of data analytics. We used measurements obtained from Google Distance Matrix API, whose algorithms are unpublished but empirically known to be accurate. We expanded our description of the traffic congestion clusters. We also expanded the description of the software used and its purpose and clarified what software is open source.

We fixed the typo that the second reviewer correctly noted in items 3 and 4, replacing the word "variation" for "change" in table 3.

We elaborated on the origin (Traffic Analysis Zone, or TAZ for the place of residence) and destination (TAZ for health care centres), as reviewer 3 recommended, and the definition of centroids.

Regarding confounding, we clarified that the study describes accessibility to inform long-term planning. It does not delve into finding the determinants of accessibility, such as the

factors that lead peripheral areas of the city to have reduced access and whether this is related to socioeconomic strata. Our intention is to test a pragmatic approach for obtaining data that informs decisions and stakeholders. Pursuing more precise measurements (e.g., travel times at a scale of seconds or going beyond hourly assessments) is unlikely to change our conclusions and would raise costs by orders of magnitude. We followed Chris Witty's advice in his article "What makes an academic paper useful for health policy" (doi:10.1186/s12916-015-0544-8), especially item 6 on what guiding action: "*Describing the problem that needs resolving is only useful until the description is clear, and policymakers understand there needs to be action. Then the policy question needs to be asked: what is the evidence about the available options for things we can do to resolve the problem?*".

Please let us know if you need any other revisions.

VERSION 2 – REVIEW

REVIEWER	Mhatre, Sharmila Open Society Foundations, Public Health Program
REVIEW RETURNED	22-Jul-2022

GENERAL COMMENTS	The authors have done a great job with the revisions. The only issue remaining is that the objective requires further clarity. The objective in the abstract is articulated differently in the abstract from the main paper. I suggest it should be same. It is unclear what "high level assessment" means when the analysis is primarily descriptive statistics? It seems that the objective is testing out a new platform/approach to determine how to increase access to tertiary emergency care and to provide another approach to inform land use planning and services. The statistics are still descriptive but it is now clearer that the point of this study is to show how the AMORE platform can be used as a tool to inform planning of programs and services. This is explained well in the interpretation section on page 15. I indicated no statistical review because it is primarily descriptive statistics, however I leave it to the editors to determine whether they want to review to check the numbers. Glad to see that you were able to revise and resubmit as it is an interesting article that will add to how we plan for services to increase health equity.

REVIEWER	Lawal , Olanrewaju University of Port Harcourt
REVIEW RETURNED	22-Jul-2022

GENERAL COMMENTS	Issues raised in the previous review have been addressed.

VERSION 2 – AUTHOR RESPONSE

We were excited to read your decision letter requesting minor changes, and we are grateful for the constructive editorial and peer-review inputs.

We provide a point-by-point response to the requested, complementing the marked copy.

- We appreciate your flexibility with the abstract. The system does not allow posting an abstract beyond 300 words; we added a comment to address the issues raised by Reviewer 1, Dr Sharmila Mhatre. Kindly use the abstract provided with the manuscript (310 words)

- We have adjusted the “Strengths and limitations of this study” section per your indications.

- The main text heading now reads “Results.”

- We rewrote the bullet points of the “Strengths and limitations of this study” section using the editorial feedback provided.

- The findings relevant to Figure 7, and the figure, were moved to the Results section, and a comment was added to the discussion.

- Table 3 has been placed in the Results section.

- Figure titles have been relocated from the main text to the end of the manuscript.

- We have replaced the title “Other information” with “Conclusions and future directions” as recommended. Indeed, it reads better, thank you. We were following the STROBE guideline.

- Your request on labelling the Contributors section was implemented

- The manuscript includes the slightly more extended abstract in which the comments from Reviewer 1 were addressed.

Please let us know if anything else is needed.